

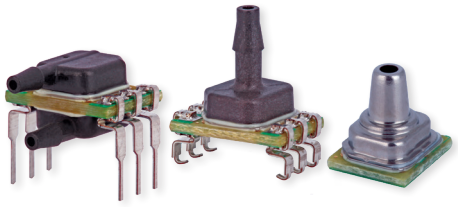
Application Brief

Pressure Sensing Solutions for Healthier Air

Honeywell Technologies

The hidden epidemic – the World Health Organization's so-called "world's largest single environmental health risk"[1] – of the impact of poor air quality has risen within public and business consciousness over the past few years.

Surprisingly, much of the threat comes from within our homes and places of work, where key pollutant concentrations can be up to 5 times higher than outdoors[2]. With good air quality linked to better occupant health, fewer sick days, and productivity gains of up to 15 %[3], the air filtration and measurement systems of tomorrow are set to deliver tangible benefits and cost savings through smart measurement, helping you and your customers to breathe easier.



Honeywell ABP3 Series Board-Mount Pressure Sensors

The Honeywell board mount pressure sensing families (ABP2 & ABP3) are supporting the next generation of air filtration systems to monitor and improve air quality within buildings. As filters become clogged with use, their performance is reduced, and the internal fan needs to work harder to keep the system operational, consuming more power in the process. With their high accuracy and reliability, Honeywell pressure sensors are vital for providing advance warning of the build-up of dust and debris on the filters, assisting maintenance teams to schedule preventative maintenance to replace or clean filters and reducing the amount of power drawn by the fan. Within this portfolio, the new Ultra-Low-Pressure (ULP) sensors are at the cutting edge of differential sensing capabilities. In a clogged filter detection application, where precision measurement is imperative, Honeywell ULP sensors enable air filtration and purification systems to be fine-tuned to meet alert thresholds. The long-term stability and reliability of these sensors also minimises costly system down time and repairs on critical building environmental system infrastructure.

Clogged Filter & Airflow Measurements

Honeywell pressure sensors enable precise air pressure measurement differences across both the upstream and downstream sides of a filter. Differential pressure sensor is equipped with two pressure ports: the P1 port connects to the input of the filter or restrictor, while the P2 port connects to the output of the filter or restrictor.

When the filter is in optimal condition, there is minimal pressure difference across it. However, as the filter becomes clogged, pressure builds up. As the clogging increases, the fan or blower must work harder to push air through the filter, leading to increased power consumption. If the filter is not maintained, the input pressure may rise to a level that could cause the filter to rupture, potentially allowing contaminants into the building. The pressure sensor monitors the condition of the filter and alerts the building controller when replacement or cleaning of the filter is necessary..

For airflow measurements, the filter is replaced with a restrictor that creates a known pressure difference. The size of the restrictor is determined based on the expected airflow rate within that part of the device or ventilation ducting.



It is important to note that both clogged filter and airflow measurements using a restrictor typically involve measuring very small pressure differences (2.5 mbar to 25 mbar/2 inH_2O to 10 inH_2O), which fall within the low end of the ultra-low-pressure range.

Figure 1. Airflow Measurement

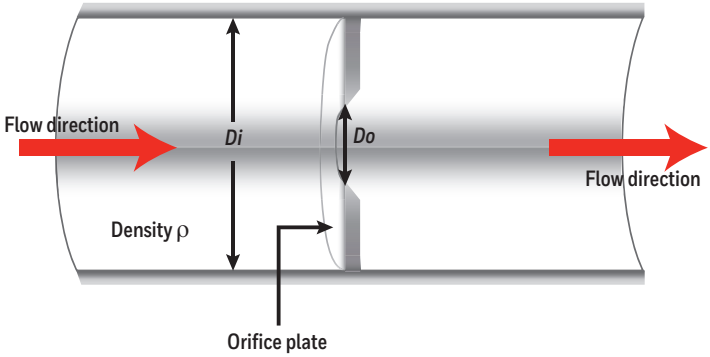
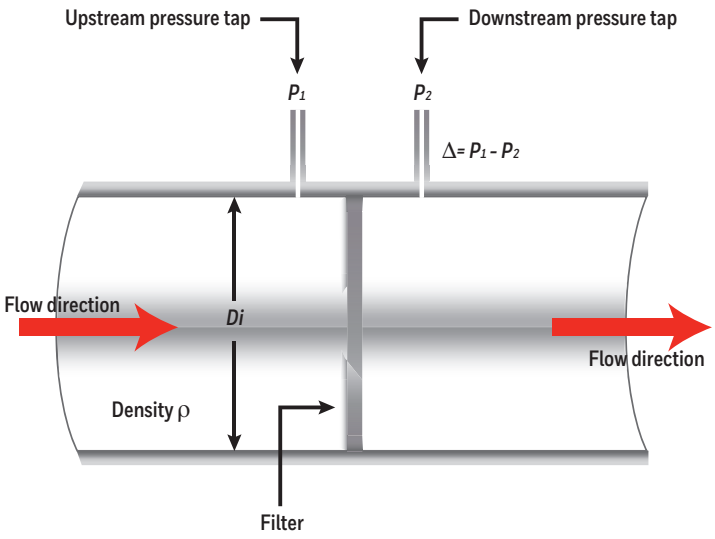
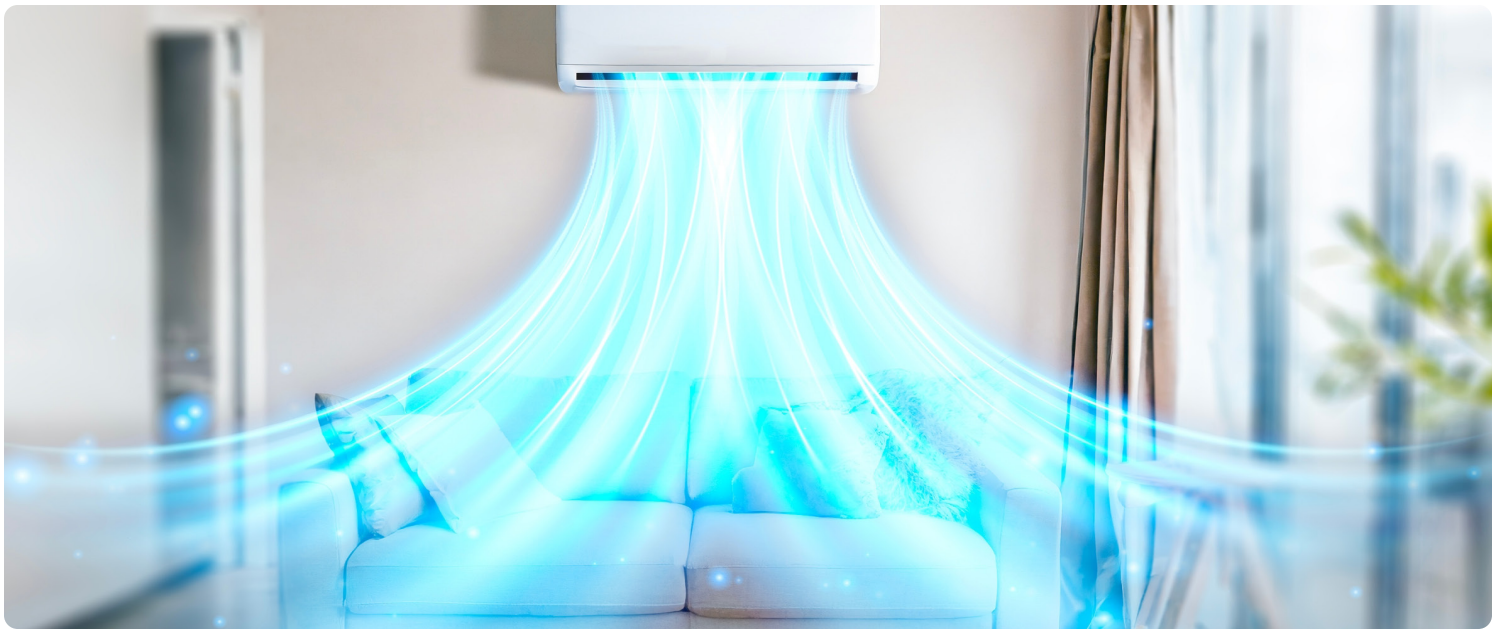
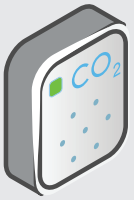


Figure 2. Clogged Filter Measurement



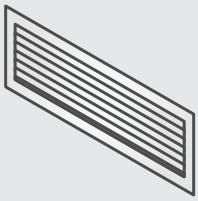


Cleaner air devices and subsystems



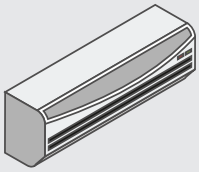
Indoor Air Quality Monitors

ABP3 monitors the volume of air passing thru the particle sensing element to improve accuracy of air quality measurements



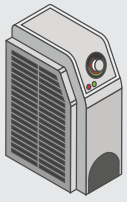
Air Filtration

ABP3 detects when filter is becoming clogged and needs to be replaced, ensuring airflow is not restricted



Air Conditioning Systems

ABP3 detects when filter is becoming clogged and needs to be replaced, ensuring airflow is not restricted



Air Purifier

ABP3 detects when filter is becoming clogged and needs to be replaced, ensuring airflow is not restricted



VAV Control/Demand Control Ventilation

ABP3 monitors and airflow within ventilation ducting (adjusting valve positioning) to prevent hot and cold spots within the build



VAV Control/Demand Control Ventilation

ABP3 can be used in instruments and handheld devices used for testing and calibration of HVAC devices

ABP2 Sensor Overview

Honeywell Technologies' ABP2 Series portfolio strength lies in its high performance, wide range of available configuration options, low power consumption, and its value assisting OEMs to simplify their design process.

High accuracy in pressure measurement is essential for ensuring optimal performance and reliability: ABP2 ULP sensors offer low errors of as low as 2 % full scale span within standard operating conditions. This enables air filtration systems to be fine-tuned for precise and efficient operation.

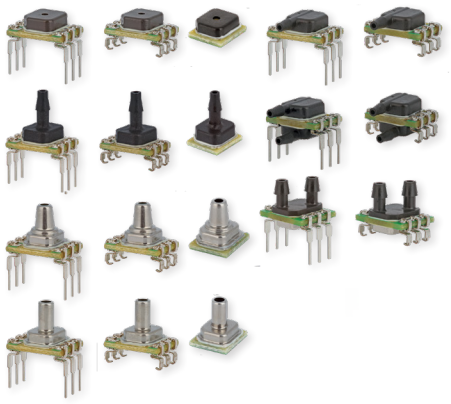
ABP2 Series' differential sensing options with dual port configurations also provide a hidden advantage. Consistent and reliable performance over the system's service life is vital to minimize downtime and performance inefficiencies. The ABP2 ULP sensors boast long-term stability and reliability, ensuring sustained efficiency and reducing the risk of costly repairs. Engineered for the long-term, ABP2 ULP sensors undergo extensive testing in our factory to verify compliance with our strict internal quality standards.

ABP3 Sensor Overview

Honeywell Technologies' ABP3 Series portfolio builds on the success of ABP2, but provides greater performance, with new features/functionality and increased safety. The ABP3 Series is offered with same port options and same electrical pin-out as ABP2 Series and therefore provides a drop-in replacement for ABP2 sensors in most instances. ABP3 pressure sensors provide increased accuracy and resolution due to its advanced ASIC filtering that removes unwanted electrical noise and boosts signal to noise ratio.

The ABP3 Series offers both faster sample rates and dynamic response times that allows the sensor to be used within condition monitoring. ABP3 pressure sensors also offer advanced diagnostics that continuously monitors the condition of the sensor for increased safety.

Honeywell Technologies' ABP3 provides enhanced EMC immunity to ensure the sensor's output and accuracy is unaffected when it is utilized within electrically noisy environments. The ABP3 Series sensors undergo extensive testing in our factory to verify compliance with strict internal quality standards.



ABP2 SERIES AT A GLANCE

- Pressure (gage): 2.5 mbar to 20 bar
- Pressure (differential): ±1.25 mbar to ±4.0 mbar
- Total error: As low as 1.5 %FSS
- Stability: <0.3 % over 1000 hrs
- Operating temperature: -40°C to 110°C
- Multiple port & package types
- Low power consumption
- Outputs: Analog, SPI, I^2C

ABP3 SERIES AT A GLANCE

- Pressure (gage): 2.5 mbar to 20 bar
- Pressure (differential): ±1.25 mbar to ±4.0 mbar
- Total error: As low as 1.5 %FSS
- Stability: <1.0 % over 5 years
- Operating temperature: -40°C to 110°C
- Advanced diagnostics
- Enhanced EMC immunity
- Outputs: Analog, SPI, I^2C



[1] https://www.who.int/news/item/25-03-2014-7-million-premature-deaths-annually-linked-to-air-pollution

[2] https://www.epa.gov/report-environment/indoor-air-quality

[3] https://www.cbi.org.uk/articles/air-quality-in-the-workplace/

⚠WARNING
IMPROPER INSTALLATION

- Consult with local safety agencies and their requirements when designing a machine control link, interface and all control elements that affect safety.
- Strictly adhere to all installation instructions.

Failure to comply with these instructions could result in death or serious injury.

Warranty/Remedy

Honeywell Technologies warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell Technologies' standard product warranty applies unless agreed to otherwise by Honeywell Technologies in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell Technologies during the period of coverage, Honeywell Technologies will repair or replace, at its option, without charge those items that Honeywell Technologies, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell Technologies be liable for consequential, special, or indirect damages.**

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008357-2-EN | 2 | 09/26
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